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EXAMINER

SHOSHO, CALLIE E

ART UNIT	PAPER NUMBER
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1714

DATE MAILED: 01/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/719,359

Applicant(s)

SANO ET AL.

Examiner

Callie E. Shosho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4-5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 3/8/01 fails to comply with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office. It has been placed in the application file, but the information referred to therein has not been considered.

The IDS filed 3/8/01, Paper No.3, requests that the 6 documents listed in the attached PTO-1449 be considered and made of record. However, there is no PTO-1449 attached to this paper. Further, while applicants state that copies of the references were previously sent to the office, it is not possible for the examiner to determine what references applicants are referring to without the 1449 form or any listing of the documents.

It is noted that applicants refer to a Search Report in Paper No.3. If applicants are in fact referring to the documents cited in the Search Report of PCT/JP00/02918, the examiner notes that these references are cited in the IDS filed 5/29/01, Paper No.4 and have been considered by the examiner (see dated and initialed IDS attached to this action).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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3. Claims 2-5, 7-8, and 13-15 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claim 2 recites "wherein the resol phenol resin is one prepared by reacting phenol with formaldehyde at 80 to 200 °C". The scope of the claim is confusing because it is not clear what is meant by "one". This word seems to suggest that the resol phenol resin is only one of the resins that can be, or is, prepared by the reaction of phenol and formaldehyde and that there are others. It is suggested that the word "one" is deleted from line 2 of the claim.

Similar confusion arises in claims 3, 5, and 7-8 where it is suggested that the word "one" is deleted from line 2 of each of the claims.

(b) Claim 3 recites that the phenol and formaldehyde are reacted under "increased" pressure. The scope of the claim is confusing because it is not clear what is meant by "increased". Increased as compared to what? To atmospheric pressure? How big is the increase?

(c) Claim 4 recites, "wherein the volatile base catalyst in the resol phenol resin is amine". The scope of the claim is confusing because it is not clear what is meant by the catalyst "in" the resin. Is the catalyst attached to the resin, dispersed in the resin, mixed with the resin? Clarification is requested.

(d) Claim 8, line 4 recites, "reacting the same with a resol phenol resin". The scope of the claim is confusing because it is not clear what "the same" refers to. If this refers to the polyhydric alcohol ester of rosin, it is suggested that "the same" is replaced with "polyhydric alcohol ester of rosin" in line 4 of the claim.

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(e) Claim 13 recites "softening point (ring and ball method) of 140 to 190 °C". The scope of the claim is confusing because it is not clear if in fact the softening point is measured by the ring and ball method. It is suggested that the phrase is re-written as "softening point, measured by the ring and ball method, of 140 to 190 °C".

Similar questions arise in lines 3-4 of claim 14 where the use of parentheses leads to confusion of whether the nitrogen residue content is in fact measured by microanalysis or if this is one possible method to measure the nitrogen residue content. It is suggested that the parentheses are removed from the claim.

(f) Claim 15 recites "petroleum hydrocarbon solvent (boiling point 276 to 313 °C, aniline point 69 °C)". Due to the use of parentheses, the scope of the claim is confusing because it is not clear if the solvent actually possesses these temperatures. Further, does the solvent possess the boiling point and the aniline point or either the boiling point or aniline point"? It is suggested that the phrase is re-written as "petroleum hydrocarbon solvent which has boiling point of 276 to 313 °C and aniline point of 69 °C".

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4-11, and 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 55-27373.

Using an English translation of the Japanese reference provided by the applicants, it is noted that JP 55-27373 discloses a process wherein rosin such as wood rosin, tall oil rosin, polymerized rosin, or hydrogenated rosin is reacted with resol phenol resin and polyhydric alcohol. The resol phenol resin is prepared by reacting phenol and formaldehyde in a ratio of 1 mol phenol to 1-4 moles formaldehyde in the presence of a volatile base catalyst such as ammonia or amine at 40-100 °C. Either the rosin is first reacted with resol phenol resin at 150-280 °C followed by reaction with polyhydric alcohol or the rosin is first reacted with polyhydric alcohol followed by reaction with resol phenol resin at 150-280 °C. The process produces a resin which has acid number less than 30, softening point of 130-190 °C, and solubility of 7 times in petroleum hydrocarbon solvent which has boiling point of 240-330 °C and aniline point of 65-100 °C. The resin is used as a binder in printing ink (claim 1, page 2, lines 18-23, page 4, lines 11-18, page 5, lines 17-19, pages 8, lines 11-20 and 22-23, page 9, lines 6-15 and 17-18, and page 10, lines 8-23). It is noted that while the present claims refer to the resin produced by the process as a phenol modified rosin ester and JP 55-27373 refers to the resin produced by the process as a rosin modified phenolic resin, given that JP 55-27373 discloses process identical to that presently claimed including identical ingredients as well as identical order in which the ingredients are reacted, it is clear that the process of JP 55-27373 would produce the same product as presently claimed.

Although there is no explicit disclosure of the nitrogen residue content resulting from the volatile base catalyst, given that JP 55-27373 discloses amine catalyst identical to that presently

claimed so that the catalyst must necessarily also possess the same volatility as the claimed catalyst as well as the same reactivity with phenol-formaldehyde as the claimed catalyst and further given that JP 55-27373 discloses the same process temperatures for reacting phenol with formaldehyde to form the resol phenol resin and for reacting rosin or polyhydric alcohol ester of rosin with resol phenol resin as presently claimed, all of which would affect the amount of residual nitrogen, it is clear that the resin formed by the process of JP 55-27373 would inherently possess the same nitrogen residual content as presently claimed.

In light of the above, it is clear that JP 55-27373 anticipates the present claims.

6. Claims 1-2, 4-6, 10, 12-14, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 7-126338.

Using an English translation of the Japanese reference provided by the applicants, it is noted that JP 7-126338 discloses a process wherein rosin such as wood rosin, tall oil rosin, polymerized rosin, or gum rosin is reacted with resol phenol resin and polyhydric alcohol. The resol phenol resin is prepared by reacting phenol and formaldehyde in a ratio of 1 mol phenol to 1-4 moles formaldehyde in the presence of a volatile base catalyst such as ammonia or amine at 90 °C. The process produces a resin which has weight average molecular weight of 30,000-250,000 and softening point of 120-200 °C. It is also disclosed that the resin is used in ink composition (claim 1, page 2, lines 6-11 and 21-24, page 3, lines 2 and 15-18, page 5, lines 4-9 and 11-21, and page 6, lines 9-10). It is noted that while the present claims refer to the resin produced by the process as a phenol modified rosin ester and JP 7-126338 refers to the resin produced by the process as a rosin modified phenolic resin, given that JP 7-126338 discloses

process identical to that presently claimed including identical ingredients, it is clear that the process of JP 7-126338 would produce the same product as presently claimed.

Although there is no explicit disclosure of the nitrogen residue content resulting from the volatile base catalyst, given that JP 7-126338 discloses amine catalyst identical to that presently claimed so that the catalyst must necessarily also possess the same volatility as the claimed catalyst as well as the same reactivity with phenol-formaldehyde as the claimed catalyst and further given that JP 7-126338 discloses the same process temperatures for reacting phenol with formaldehyde to form the resol phenol resin as presently claimed, all of which would affect the amount of residual nitrogen, it is clear that the resin formed by the process of JP 7-126338 would inherently possess the same nitrogen residual content as presently claimed.

In light of the above, it is clear that JP 7-126338 anticipates the present claims.

7. Claims 1-2, 4-6, 8-11, 14, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 63-86771.

Using an English translation of the Japanese reference provided by the applicants, it is noted that JP 63-86771 discloses a process wherein rosin such as wood rosin, gum rosin, or polymerized rosin is reacted with resol phenol resin and polyhydric alcohol. The resol phenol resin is prepared by reacting phenol and formaldehyde in a ratio of 1 mol phenol to 0.2-4 moles formaldehyde in the presence of a volatile base catalyst such as ammonia or amine at 90 °C. The rosin is first reacted with polyhydric alcohol followed by reaction with resol phenol resin at 150 °C or higher. The process produces a resin which has acid number less than 40. It is also disclosed that the resin is used in ink composition (page 2, lines 7-16, page 3, lines 13-15 and 18-

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21, page 4, lines 1-8, page 5, line 24-page 6, line 5, page 6, line 24-page 7, line 5, and page 9, line 7).

Although there is no explicit disclosure of the nitrogen residue content resulting from the volatile base catalyst, given that JP 63-86771 discloses amine catalyst identical to that presently claimed so that the catalyst must necessarily also possess same volatility as the claimed catalyst as well as the same reactivity with phenol-formaldehyde as the claimed catalyst and further given that JP 63-86771 discloses same process temperatures for reacting phenol with formaldehyde to form the resol phenol resin and for reacting rosin or polyhydric alcohol ester of rosin with resol phenol resin as presently claimed, all of which would affect the amount of residual catalyst, it is clear that the resin formed by the process of JP 63-86771 would inherently possess the same nitrogen residual content as presently claimed.

In light of the above, it is clear that JP 63-86771 anticipates the present claims.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55-27373, JP 7-126338, or JP 63-86771 any of which in view of Dando et al. (U.S. 5,908,914).

The disclosures with respect to JP 55-27373, JP 7-126338, and JP 63-86771 in paragraphs 5, 6, and 7, respectively, are incorporated here by reference.

The difference between either JP 55-27373, JP 7-126338, or JP 63-86771 and the present claimed invention is the requirement in the claims of reacting the phenol and formaldehyde in a closed reactor under increased pressure when forming the resol phenol resin.

Dando et al., which is drawn to phenolic resol resins, disclose that preparing phenol-formaldehyde in a sealed reactor under pressure has several advantages over using an open reactor such as higher yield resol resin per unit time, lower yields of unreacted starting materials,

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and shorter cycle times. Further, examples 4-5 show that if the pressure is increased, the cycle time decreases while the resin yield increases (col.2, lines 43-67 and col.14, lines 30-50).

In light of the motivation for reacting phenol and formaldehyde in a closed reactor under increased pressure disclosed by Dando et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to react the phenol and formaldehyde in either JP 55-27373, JP 7-126338, or JP 63-86771 in a closed reactor under increased pressure in order to produce higher yield resin per unit time, lower yields of unreacted starting materials, and shorter cycle times, and thereby arrive at the claimed invention.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 55-27373 or JP 63-86771 either of which in view of either JP 7-126388 or DeBlasi et al. (U.S. 4,857,624).

The disclosures with respect to JP 55-27373 and JP 63-86771 in paragraphs 5 and 7, respectively, are incorporated here by reference.

The difference between either JP 55-27373 or JP 63-86771 and the present claimed invention is the requirement in the claims of the weight average molecular weight of the phenol modified rosin ester.

JP 7-126388, which is drawn to a process for preparing phenol modified rosin ester suitable for use in inks, disclose that the resin has weight average molecular weight (M_w) of 30,000-250,000 and that if M_w is less than 30,000, the resistance to misting is reduced (claim 1 and page 5, lines 4-7).

Alternatively, DeBlasi et al., which is drawn to phenolic modified rosin ester for printing inks, disclose the use of phenolic modified rosin ester having high M_w , for instance

approximately 80,000 or 200,000 and disclose that using such phenolic modified rosin ester produces inks which exhibit more consistent printing results, improved hold out, and excellent reducibility as well as good gloss and good film forming properties (col.3, lines 20-31, col.4, lines 1-66, and examples 1 and 3).

In light of the motivation for using phenol modified rosin ester with specific M_w disclosed by either JP 7-126338 or DeBlasi et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use resin with such M_w in either JP 55-27373 or JP 63-86771 in order to produce an ink with good resistance to misting or alternatively, consistent printing results, improved hold out, and excellent reducibility, and thereby arrive at the claimed invention.

12. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 7-126338 in view of JP 55-27373.

The disclosure with respect to JP 7-126338 in paragraph 6 above is incorporated here by reference.

The difference between JP 7-126338 and the present claimed invention is the requirement in the claims of the order of reacting the rosin, resol phenol resin, and polyhydric alcohol

There is no explicit disclosure in JP 7-126338 of the order in which the rosin, resol phenol resin, and polyhydric alcohol are reacted. However, it is well known as found in JP 55-27373, that it is conventional in the art that the either rosin is first reacted with resol phenol resin at 150-280 °C followed by reaction with polyhydric alcohol or the rosin is first reacted with polyhydric alcohol followed by reaction with resol phenol resin at 150-280 °C in order to

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produce a resin which is suitable for use as a binder in printer ink, i.e. binder enables printing free of misting, rapid setting, quick drying, and high speed printing (page 2, lines 6-10).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to either first react the rosin with resol phenol resin at 150-280 °C followed by reaction with polyhydric alcohol or first react the rosin with polyhydric alcohol followed by reaction with resol phenol resin at 150-280 °C in JP 7-126338 in order to produce resin suitable for use in printing ink, and thereby arrive at the claimed invention.

13. Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 7-126338 in view of Oishi et al. (U.S. 4,002,585).

The disclosure with respect to JP 7-126338 in paragraph 6 above is incorporated here by reference.

The difference between JP 7-126338 and the present claimed invention is the requirement in the claims of the acid number and solubility of the phenol modified rosin ester.

Oishi et al., which is drawn to process of producing phenolic modified rosin ester, disclose phenolic modified rosin ester which has acid number of not more than 30 and disclose that if the acid number exceeds 30, interfacial balance is lost and storage stability is decreased (col.2, line 65-col.3, line 3). Oishi et al. further disclose that the phenolic modified rosin ester has solubility in petroleum hydrocarbon solvent of not less than 5 times and that if the solubility is less, ink setting time is too long and set off may take place (col.3, lines 3-5).

In light of the motivation for using phenolic modified rosin ester with specific acid number and solubility disclosed by Oishi et al. as described above, it therefore would have been

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obvious to one of ordinary skill in the art to use phenolic modified rosin ester with such acid number and solubility in JP 7-126338 in order to produce ink with good surface tension, storage stability, and setting time, and thereby arrive at the claimed invention.

14. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 63-86771 in view of Oishi et al. (U.S. 4,002,585).

The disclosure with respect to JP 63-86771 in paragraph 7 above is incorporated here by reference.

The difference between JP 63-86771 and the present claimed invention is the requirement in the claims of solubility of the phenol modified rosin ester.

Oishi et al., which is drawn to process of producing phenolic modified rosin ester, disclose phenolic modified rosin ester which has solubility in petroleum hydrocarbon solvent of not less than 5 times and that if the solubility is less, ink setting time is too long and set off may take place (col.3, lines 3-5).

In light of the motivation for using phenolic modified rosin ester with specific solubility disclosed by Oishi et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use phenolic modified rosin ester with such solubility in JP 63-86771 in order to produce ink with good setting time, and thereby arrive at the claimed invention.

15. Claims 1-2, 4-11, and 13-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Oishi et al. (U.S. 4,002,585) in view of either Lederman et al. (U.S. 3,053,807) or *Encyclopedia of Polymer Science and Engineering*.

Oishi et al. disclose a process wherein rosin such as gum rosin, wood rosin, tall oil rosin, partially polymerized rosin, or hydrogenated rosin is reacted with resol phenol resin and polyhydric alcohol. The resol phenol resin is prepared by reacting phenol and formaldehyde in a ratio of 1 mol phenol to 2 moles formaldehyde in the presence of a base catalyst at 50-100 °C. Either the rosin is first reacted with resol phenol resin at 150-250 °C followed by reaction with polyhydric alcohol or rosin is first reacted with polyhydric alcohol followed by reaction with resol phenol resin at 150-250 °C. The process produces a resin which has acid number of not more than 30, softening point not less than 140 °C, and solubility of 5 times in petroleum hydrocarbon solvent which has boiling point of 276-312 °C and aniline point of 73 °C. The resin is used as a binder in printing ink (col.2, lines 5-6 and 19-41, col.3, lines 20-46, col.4, lines 48-55, col.5, lines 16-21, 47-49, and 65-68, and example 1).

The difference between Oishi et al. and the present claimed invention is the requirement in the claims of a volatile base catalyst.

Oishi et al. disclose the use of base catalyst such as sodium hydroxide, but there is no disclosure of a volatile base catalyst as presently claimed.

Lederman et al., which is drawn to preparing phenol-formaldehyde resin, disclose using amine catalyst instead of sodium hydroxide catalyst in order to avoid the expense and additional time required for the usual neutralization and washing steps required when sodium hydroxide is employed. Also, by using the amine catalyst, the loss of yield is avoided (col.1, lines 18-35 and 48-54 and col.3, lines 27-49).

Alternatively, *Encyclopedia of Polymer Science and Engineering* (pages 56-57) discloses that special resoles are obtained with amine catalysts which affect the chemical and physical

properties because of the incorporation of the amine into the resole. As compared to resole prepared in the presence of sodium hydroxide, a resole prepared using amine catalyst has higher molecular weight, less free phenol, lower water solubility, and higher glass transition temperature.

Although there is no explicit disclosure in either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* of the nitrogen residue content resulting from the use of volatile amine catalyst, given that either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* disclose amine catalyst identical to that presently so that the catalyst must also necessarily possess same volatility as the claimed catalyst as well as the same reactivity with phenol-formaldehyde as the claimed catalyst and further given that Oishi et al. disclose same process temperatures for reacting phenol with formaldehyde to form the resol phenol resin and for reacting rosin or polyhydric alcohol ester of rosin with resol phenol resin as presently claimed, all of which would affect the amount of residual catalyst, it is clear that the resin formed by the process of Oishi et al. would intrinsically possess the same nitrogen residual content as presently claimed when using the amine catalyst disclosed by either Lederman et al. or *Encyclopedia of Polymer Science and Engineering*.

In light of the motivation for using volatile amine catalyst disclosed by either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* as described above, it therefore would have been obvious to one of ordinary skill in the art to use this type of catalyst in the process of Oishi et al. in order to inexpensively produce a resin in a shorter amount of time, or alternatively, to produce a resin with suitable molecular weight, solubility, and glass transition temperature, and thereby arrive at the claimed invention.

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16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oishi et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* as applied to claims 1-2, 4-11, and 13-17 above, and further in view of Dando et al. (U.S. 5,908,914).

The difference between Oishi et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* and the present claimed invention is the requirement in the claims of reacting the phenol and formaldehyde in a closed reactor under increased pressure when forming the resol phenol resin.

Dando et al., which is drawn to phenolic resol resins, disclose that preparing phenol-formaldehyde in a sealed reactor under pressure has several advantages over using an open reactor such as higher yield resol resin per unit time, lower yields of unreacted starting materials, and shorter cycle times. Further, examples 4-5 show that if the pressure is increased, the cycle time decreases while the resin yield increases (col.2, lines 43-67 and col.14, lines 30-50).

In light of the motivation for reacting phenol and formaldehyde in a closed reactor under increased pressure disclosed by Dando et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to react the phenol and formaldehyde in Oishi et al. in a closed reactor under increased pressure in order to produce higher yield resol resin per unit time, lower yields of unreacted starting materials, and shorter cycle times, and thereby arrive at the claimed invention.

17. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oishi et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* as applied

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to claims 1-2, 4-11, and 13-17 above, and further in view of either JP 7-126388 or DeBlasi et al. (U.S. 4,857,624).

The difference between Oishi et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* and the present claimed invention is the requirement in the claims of the weight average molecular weight of the phenol modified rosin ester.

JP 7-126388, which is drawn to a process for preparing phenol modified rosin ester suitable for use in inks, disclose that the resin has weight average molecular weight (M_w) of 30,000-250,000 and that if M_w is less than 30,000, the resistance to misting is reduced (claim 1 and page 5, lines 4-7).

Alternatively, DeBlasi et al., which is drawn to phenolic modified rosin ester for printing inks, disclose the use of phenolic modified rosin ester having high M_w , for instance approximately 80,000 or 200,000 and disclose that using such phenolic modified rosin ester produces inks which exhibit more consistent printing results, improved hold out, and excellent reducibility as well as good gloss and good film forming properties (col.3, lines 20-31, col.4, lines 1-66, and examples 1 and 3).

In light of the motivation for using phenol modified rosin ester with specific M_w disclosed by either JP 7-126338 or DeBlasi et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use resin with such in Oishi et al. in order to produce an ink with good resistance to misting or alternatively, consistent printing results, improved hold out, and excellent reducibility, and thereby arrive at the claimed invention.

18. Claims 1-8, 10-11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frihart et al. (U.S. 6,022,947) in view of either Lederman et al. (U.S. 3,053,807) or *Encyclopedia of Polymer Science and Engineering*.

Frihart et al. disclose a process wherein rosin such as gum rosin, wood rosin, or tall oil is reacted with resol phenol resin and polyhydric alcohol. The resol phenol resin is prepared by reacting phenol and formaldehyde in a ratio of 1 mol phenol to 1.8-2.5 moles formaldehyde in the presence of a base catalyst at 50-160 °C. Either the rosin is first reacted with resol phenol resin followed by reaction with polyhydric alcohol or rosin is first reacted with polyhydric alcohol followed by reaction with resol phenol resin. The process produces a resin which has acid number less than 25 (col.2, lines 10-15, 40-43, and 64-67, col.3, lines 4 and 8, col.5, lines 10-11, 18, 34-46, col.7, lines 28-36 and 43-48, col.10, lines 27-66, and example 9).

The difference between Frihart et al. and the present claimed invention is the requirement in the claims of a volatile base catalyst.

Frihart et al. disclose the use of base catalyst such as sodium hydroxide, but there is no disclosure of a volatile base catalyst as presently claimed.

Lederman et al., which is drawn to preparing phenol-formaldehyde resin, disclose using amine catalyst instead of sodium hydroxide catalyst in order to avoid the expense and additional time required for the usual neutralization and washing steps required when sodium hydroxide is employed. Also, by using the amine catalyst, the loss of yield is avoided (col.1, lines 18-35 and 48-54 and col.3, lines 27-49).

Alternatively, *Encyclopedia of Polymer Science and Engineering* (pages 56-57) discloses that special resoles are obtained with amine catalyst which affect the chemical and physical

properties because of the incorporation of the amine into the resole. As compared to resole prepared in the presence of sodium hydroxide, a resole prepared using amine catalyst has higher molecular weight, less free phenol, lower water solubility, and higher glass transition temperature.

Although there is no explicit disclosure in either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* of the nitrogen residue content resulting from the use of volatile amine catalyst, given that either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* disclose amine catalyst identical to that presently so that the catalyst must also necessarily possess same volatility as the claimed catalyst as well as the same reactivity with phenol-formaldehyde as the claimed catalyst and further given that Frihart et al. disclose same process temperatures for reacting phenol with formaldehyde to form the resol phenol resin as presently claimed, all of which would affect the amount of residual catalyst, it is clear that the resin formed by the process of Frihart et al. would intrinsically possess the same nitrogen residual content as presently claimed when using the amine catalyst disclosed by either Lederman et al. or *Encyclopedia of Polymer Science and Engineering*.

In light of the motivation for using volatile amine catalyst disclosed by either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* as described above, it therefore would have been obvious to one of ordinary skill in the art to use this type of catalyst in the process of Frihart et al. in order to produce a more inexpensive resin in a shorter amount of time, or alternatively, a resin with suitable molecular weight, solubility, and glass transition temperature, and thereby arrive at the claimed invention.

19. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frihart et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* as applied to claims 1-8, 10-11, and 14 above, and further in view of either JP 7-126388 or DeBlasi et al. (U.S. 4,857,624).

The difference between Frihart et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* and the present claimed invention is the requirement in the claims of the weight average molecular weight of the phenol modified rosin ester.

JP 7-126388, which is drawn to a process for preparing phenol modified rosin ester suitable for use in inks, disclose that the resin has weight average molecular weight (M_w) of 30,000-250,000 and that if M_w is less than 30,000, the resistance to misting is reduced (claim 1 and page 5, lines 4-7).

Alternatively, DeBlasi et al., which is drawn to phenolic modified rosin ester for printing inks, disclose the use of phenolic modified rosin ester having high M_w , for instance approximately 80,000 or 200,000 and disclose that using such phenolic modified rosin ester produces inks which exhibit more consistent printing results, improved hold out, and excellent reducibility as well as good gloss and good film forming properties (col.3, lines 20-31, col.4, lines 1-66, and examples 1 and 3).

In light of the motivation for using phenol modified rosin ester with specific M_w disclosed by either JP 7-126338 or DeBlasi et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use resin with such in Frihart et al. in order to produce an ink with good resistance to misting or alternatively, consistent printing results, improved hold out, and excellent reducibility, and thereby arrive at the claimed invention.

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20. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frihart et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* as applied to claims 1-8, 10-11, and 14 above, and further in view of Oishi et al. (U.S. 4,002,585).

The difference between Frihart et al. in view of either Lederman et al. or *Encyclopedia of Polymer Science and Engineering* and the present claimed invention is the requirement in the claims of solubility of the phenol modified rosin ester.

Oishi et al., which is drawn to process of producing phenolic modified rosin ester, disclose phenolic modified rosin ester which has solubility in petroleum hydrocarbon solvent of not less than 5 times and that if the solubility is less, ink setting time is too long and set off may take place (col.3, lines 3-5).

In light of the motivation for using phenolic modified rosin ester with specific solubility disclosed by Oishi et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use phenolic modified rosin ester with such solubility in Frihart et al. in order to produce ink with good setting time, and thereby arrive at the claimed invention.

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matzinger (U.S. 5,969,071) and Bender (U.S. 5,698,668) each disclose a method for preparing phenolic modified rosin resins, however, there is no disclosure in either reference of volatile base catalyst as presently claimed.

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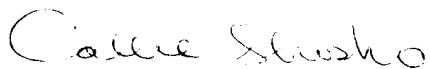
Bender et al. (U.S. 5,708,078) disclose a method for preparing rosin-aldehyde adducts, however, the process contains no phenol or phenol-formaldehyde which is indirect contrast to the present claims.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 703-305-0208. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 703-306-2777. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Callie E. Shosho
Examiner
Art Unit 1714



Callie Shosho
January 26, 2002